

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): An image photographing apparatus comprising:

a compensation lens group;

a focusing driving part for fixing the compensation lens group, the focus driving part comprising: (i) a first lens barrel combined with the compensation lens group in its interior and forming a first male screw on its outer circumference; (ii) a second lens barrel combined with a focus actuator in its exterior and forming a first female screw, which is screw-combined with the first male screw on its inner circumference; and (iii) a tool groove installed on the first lens barrel to insert and rotate a tool;

a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group;

a fixing part for supporting the focus actuator;

a photographing element for photographing an image of an object passing the compensation lens group; and

a controlling part for controlling the focus actuator and the photographing element.

Claim 2 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focus actuator for controlling the focusing of the compensation lens group;
- a first zoom driving part for supporting the focus actuator, the first zoom driving part comprising: (i) a first lens barrel combined with the compensation lens group in its interior and forming a first male screw on its outer circumference; and (ii) a second lens barrel combined with a focus actuator in its exterior and forming a first female screw, which is screw-combined with the first male screw on its inner circumference;
- a displacement lens group;
- a second zoom driving part for supporting the displacement lens group, the second zoom driving part comprising: (i) a third lens barrel combined with the displacement lens group in its interior and forming a second male screw on its outer circumference; and (ii) a fourth lens barrel combined with the focus actuator in its exterior and forming a second female screw, which is screw-combined with the first male screw on its inner circumference, at least one of the first lens barrel and the third lens barrel having a tool groove installed thereon to receive and rotate a tool inserted into the tool groove;
- a zoom actuator for driving the first zoom driving part to move the compensation lens group along a first moving trajectory, which is a zoom transition path, and driving the second zoom driving part to move the displacement lens group along a second moving trajectory, which is a path of a zoom transition path;
- a photographing element for photographing an image of an object passing the compensation lens group and the displacement lens group; and
- a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claims 3 to 5 (canceled)

Claim 6 (previously presented): The image photographing apparatus of claim 79, further comprising a yoke between the magnet and the focus driving part for increasing efficiency of the magnetic field generated by the magnet.

Claim 7 (currently amended): The image photographing apparatus of claim 79, further comprising a yoke between the magnet and the fixing first zoom driving part for increasing efficiency of the magnetic field generated by the magnet.

Claim 8 (canceled)

Claim 9 (previously presented): The image photographing apparatus of claim 81, the driving part comprising:

- a motor rotating by the power source supplied by the controlling part;
- a spur gear combined with a center shaft of the motor to be rotated; and
- a rotor forming a gear tooth combined with the spur gear and rotating by receiving the power source supplied by the controlling part.

Claim 10 (previously presented): The image photographing apparatus of claim 81, the driving part comprising:

- a motor rotating by the power source supplied by the controlling part;
- a lead screw combined with a rotation shaft of the motor; and
- a screw holder combined with the lead screw to move along the direction orthogonal to the optical axis by rotation of the lead screw.

Claim 11 (previously presented): The image photographing apparatus of claim 81, the cam part comprising an inclined surface formed on the driving part for ascending the focus driving part in the direction of the optical axis, wherein the focus driving part forms a prominence contacting to the inclined surface.

Claims 12 to 13 (canceled)

Claim 14 (previously presented): The image photographing apparatus of claim 83, the focus actuator comprising:

a magnet fixed to the fixing part or the focus driving part;

a driving coil fixed to the side of the fixing part or the focus driving part, where the magnet is not fixed, to be exposed to the magnetic field of the magnet, and, at the time of applying the current of the controlling part, wound to generate a force to drive the focus driving part in the direction of the optical axis by receiving the magnetic flux of the magnet; and

a magnetic substance fixed to the side where the driving coil is fixed, and moving the focus driving part by force attracted to the magnetic force of the magnet to fix the focus driving part to a predetermined position.

Claim 15 (previously presented): The image photographing apparatus of claim 83, the suspension member comprising a plate spring or a wire spring.

Claim 16 (previously presented): The image photographing apparatus of claim 15, the plate spring comprising:

an elastic transformed part transformed in the direction of the optical axis by narrowing the width between the fixing part and the focus driving part;

a plurality of first holes; and

first and second bosses inserted into a plurality of the first holes to fix the suspension member to the first zoom driving part and the focus driving part.

Claim 17 (canceled)

Claim 18 (previously presented): The image photographing apparatus of claim 84, the guide means comprising:

a slide prominence formed on one side of the focus driving part in the direction of the optical axis; and

a slide groove formed on the side where the slide prominence of the focus driving part is not formed for guiding the slide prominence to be moved in the direction of the optical axis.

Claim 19 (previously presented): The image photographing apparatus of claim 84, the guide means comprising a guide shaft slidably combined to a guide hole formed on the focus driving means.

Claim 20 (previously presented): The image photographing apparatus of claim 19, the guide means further comprising three or more guide parts formed on the fixing part in the direction of the optical axis to guide the outer circumferential surface of the focus driving part in the direction of the optical axis.

Claim 21 (currently amended): The image photographing apparatus of claim ~~84~~19, the controlling part further comprising:

a controlling signal generating part for generating a low frequency amplitude modulation control signal for preventing a friction force for an initial predetermined driving time for supplying current to the driving coil, and for generating a high frequency amplitude modulation control signal after the initial predetermined driving time; and

a pulse width modulation signal outputting part for outputting the low frequency amplitude modulation control signal generated by the controlling signal generating part and a pulse width modulating signal outputting part having a lower frequency section and a high frequency section which switch on/off according to the high frequency amplitude modulation control signal to drive the driving coil of the focus actuator.

Claim 22 (currently amended): The image photographing apparatus of claim 21, ~~characterized in that wherein~~ the low frequency amplitude modulation controlling signal and the high low frequency amplitude modulation controlling signal have an ~~the~~ identical duty ratio.

Claims 23 (previously presented): The image photographing apparatus of claim 22, a pulse width modulation signal outputting part comprising:

a transistor having an emitter connected to the ground, a base for receiving the low frequency amplitude modulation control signal and the high frequency amplitude modulation control signal generated by the controlling signal generating part, and a collector connected to a driving element; and

a resistor connected between the transistor and the base; and

a diode connected between the collector of the transistor and the power source.

Claim 24 (canceled)

Claim 25 (currently amended): The image photographing apparatus of claim 85, the compensating compensation-suspension member comprising a wire spring or a plate spring.

Claims 26 (previously presented): The image photographing apparatus of claim 85, the compensation actuator comprising one of a voice coil motor, a piezoelectric element and a ultrasonic motor.

Claim 27 (previously presented): The image photographing apparatus of claim 79, the focus actuator further comprising an initial position fixing part for fixing the focus driving part to an initial position by a predetermined braking power.

Claim 28 (previously presented): The image photographing apparatus of claim 27, the initial position fixing part comprising a first magnetic substance fixed to the side, where the magnet of the focus driving part is fixed, not to be exposed to the range of the magnetic line of force on the side, where the magnet of the focus driving part is not fixed, and attracts the magnet in order to fix the focus driving part to the initial position.

Claim 29 (previously presented): The image photographing apparatus of claim 79, the focus actuator further comprising a specific magnification position fixing part for moving the focus driving part to a specific position so that the object image of the compensation lens group is projected with a specific magnification.

Claim 30 (previously presented): The image photographing apparatus of claim 29, the specific magnification position comprising a second magnetic substance fixed to the side, where the magnet of the focus driving part is not fixed, not to be exposed to the range of the magnetic line of force, and attracts the magnet to fix the focus driving part to the initial position, in order to fix the focus driving part to a specific magnification position.

Claims 31 to 32 (canceled)

Claim 33 (previously presented): The image photographing apparatus of claim 86, the actuation source comprising:

a rotation driving part for generating a rotary force by control of the controlling part; and
a rotor for receiving a dynamic force of the rotation driving part to be rotated.

Claim 34 (currently amended): The image photographing apparatus of claim 33, the first zoom driving member comprising:

a first inclined surface ascending the first zoom driving part by rotation of the rotor to move the compensation lens group along the first moving trajectory, ~~which is the zoom transition path.~~

Claim 35 (currently amended): The image photographing apparatus of claim 33, the second zoom driving member comprising a second inclined surface ascending the second zoom driving part by rotation of the rotor to move the displacement lens group along the second moving trajectory, ~~which is the zoom transition path.~~

Claim 36 (previously presented): The image photographing apparatus of claim 86, the actuation source comprising:

- a motor for receiving a power source from the controlling part to be rotated;
- a spur gear combined with a center shaft of the motor to be rotated; and
- a rotor forming a gear tooth combined with the spur gear.

Claim 37 (previously presented): The image photographing apparatus of claim 86, the actuation source comprising:

- a motor for receiving a power source from the controlling part to be rotated;
- a lead screw combined with the rotation shaft of the motor; and
- a screw holder combined with the lead screw to move in the direction orthogonal to the optical axis by rotation of the lead screw.

Claim 38 (previously presented): The image photographing apparatus of claim 37, the screw holder comprising a guide shaft for guiding the movement of the screw holder.

Claim 39 (currently amended): The image photographing apparatus of claim 37, the first zoom driving member comprising a first ~~third~~-inclined surface formed on the screw holder and ascending the first zoom driving part in the direction of the optical axis when the screw holder moves in the direction orthogonal to the optical axis in order to move the compensation lens group along the first moving trajectory, ~~which is the zoom transition path.~~

Claim 40 (currently amended): The image photographing apparatus of claim ~~39~~37, the second zoom driving member comprising a second ~~fourth~~-inclined surface formed on the screw holder and ascending the second zoom driving part in the direction of the optical axis when the screw holder moves in the direction orthogonal to the optical axis in order to move the second zoom lens group along the second moving trajectory, ~~which is the zoom transition path.~~

Claim 41 (canceled)

Claim 42 (currently amended): The image photographing apparatus of claim 87, the stator comprising:

a magnetic substance formed by laminating two members, and having a plurality of upper cores, which ~~are~~ respectively correspond to an ~~the~~ identical first polarity divided from the two-ring shaped first and the second magnets;

a magnetic substance having a plurality of lower cores, which ~~are~~ respectively correspond to an ~~the~~ identical second polarity divided from at least one of the two-ring shaped magnets ~~the first magnet~~ and which are respectively inserted into the upper cores; and

a first driving coil wound on an outer circumference of a combined substance of the upper core with the lower core.

Claims 43 (previously presented): The image photographing apparatus of claim 42, the first rotator comprising a first rotation barrel forming a first trajectory groove consistent with the first moving trajectory, and the first cam part comprising:

a first cam shaft fixed to the first lens barrel, and inserted into the first trajectory groove; and

a first guide barrel forming a first slot for guiding the first cam shaft such that it only moves in the direction of the optical axis.

Claim 44 (currently amended): The image photographing apparatus of claim 42, the second rotator comprising:

a third lens barrel for fixing the zoom lens group; and

a second cam part for converting the rotation force of the second rotator to feed force in the direction of the optical axis to transfer it to the third lens barrel; and;

~~and second rotator further comprising:~~

a second rotation barrel fixed by at least one of the two-ring shaped magnets ~~the second magnet~~ and forming a second trajectory groove consistent with the second moving trajectory; ~~which is the zoom transition path.~~

Claims 45 (currently amended): The image photographing apparatus of claim 42, the first cam- part comprising:

a first magnet; and

a first cam barrel formed on a cross-section of the first rotation barrel and forming a first cam surface for moving the first lens barrel along the first moving trajectory;

~~and the first cam part comprising:~~

a second cam barrel formed on a cross-section of the third rotation barrel and forming a second cam surface for moving the first lens barrel along the first moving trajectory; and

an elastic member generating a predetermined elasticity for pushing the first lens barrel to the cam barrel.

Claim 46 (currently amended): The image photographing apparatus of claim 45, ~~characterized in that wherein~~ the first cam surface is formed as a double row in ~~the~~ symmetrical position, and at least two portions ~~points~~ of the first ~~third~~ lens barrel ~~are~~ respectively contact to the first cam surface.

Claim 47 (currently amended): The image photographing apparatus of claim 87, the second zoom actuator comprising:

a second stator for receiving the a-power source from the controlling part, and having a second coil for generating a magnetic field having first and second polarities which are divided into a plurality of sections and which are respectively alternated;

a second rotator having a second magnet in which first and second polarities are divided to be exposed to each divided magnetic field generated from the second coil, and performing a rotational motion at the time of applying current to the second coil;

a second lens barrel for fixing the compensation lens group; and

a second cam part for converting the rotational force of the first rotator to a feed force in the direction of the optical axis and transferring it to the second lens barrel.

Claim 48 (previously presented): The image photographing apparatus of claim 47, the second stator comprising:

a third magnetic substance having a plurality of third cores respectively corresponding to the same first polarity divided from the second magnet;

a fourth magnetic substance having a plurality of fourth cores respectively corresponding to the same second polarity divided from the second magnet and respectively inserted into the third cores; and

the second coil wound around the outer circumference of the third cores and the fourth cores while the fourth cores are combined between each third core.

Claim 49 (previously presented): The image photographing apparatus of claim 47, the second rotator comprising:

a second magnet; and

a second rotation barrel forming a second trajectory groove consistent with the second moving trajectory,

said second cam part comprises:

a second cam shaft fixed to the fourth lens barrel and inserted into the second trajectory groove; and

a second guide barrel forming a second slot for guiding the second cam shaft such that it only moves in the direction of the optical axis.

Claim 50 (currently amended): An image photographing apparatus comprising:

- a focus lens group;
- a focus actuator for adjusting the focusing of the focusing lens group;
- a focus driving part between the focusing lens group and the focus actuator, wherein the focus driving part comprises: (i) a first lens barrel combined with the compensation lens group in its interior and forming a first male screw on its outer circumference; ~~and~~ (ii) a second lens barrel combined with the focus actuator in its exterior and forming a first female screw, which is screw-combined with the first male screw on its inner circumference; and (iii) a tool groove installed on the first lens barrel to insert and rotate a tool;
- a fixing part for supporting the focus actuator;
- a compensation lens group;
- a first third ~~third~~ zoom driving part for supporting the compensation lens group;
- a displacement lens group;
- a second zoom driving part for supporting the displacement lens group;
- a zoom actuator for driving the first third ~~third~~ zoom driving part to move the compensation lens group along a ~~the~~ first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along a ~~the~~ second moving trajectory;
- a photographing element for photographing an object image passing the compensation lens group and the displacement lens group; and
- a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 51 (canceled)

Claim 52 (currently amended): The image photographing apparatus of claim 50 , the focus actuator comprising:

a driving coil wound on one side of the focus driving part or the first zoom drifting part to be fixed, the driving coil having a flat part and being configured to receive ~~receiving~~ current from the controlling part; and

a magnet fixed to one side of the focus driving part or the first zoom driving part, wherein the polarity of the magnet is divided so that the magnetic flux passes over the flat part of the driving coil.

Claim 53 (currently amended): The image photographing apparatus of claim 52, the focus actuator comprising a ~~second~~-restoration spring for restoring the focus driving part to an ~~the~~ initial position.

Claim 54 (previously presented): The image photographing apparatus of claim 52, further comprising a yoke on a side of the magnet for circulating the magnetic flux.

Claims 55 to 59 (canceled)

Claim 60 (previously presented): The image photographing apparatus of claim 91, the actuation source comprising:

a rotation driving part for generating a rotary force by control of the controlling part; and
a rotor for receiving a dynamic force of the rotation driving part to be rotated.

Claim 61 (currently amended): The image photographing apparatus of claim 60, the first zoom driving member comprising a first inclined surface ascending the first zoom driving part by rotation of the rotor to move the compensation lens group along the second moving trajectory, ~~which is the zoom transition path~~, and the second zoom driving member comprising a second inclined surface ascending the second zoom driving part by rotation of the rotor to move the displacement lens group along the second moving trajectory, ~~which is the zoom transition path~~.

Claim 62 (previously presented): The image photographing apparatus of claim 60, the actuation source comprising:

- a yoke;

- a coil wound on the yoke and receiving a power source from the controlling part for magnetizing the yoke; and

- a rotor rotatably installed on the yoke, thereby facing the yoke, and consisting of a magnet rotating according to the direction to which the current applied to the coil.

Claim 63 (previously presented): The image photographing apparatus of claim 60, the actuation source comprising:

- a motor for receiving a power source from the controlling part to be rotated;

- a rotor forming a spur gear combined with the spur gear.

Claim 64 (previously presented): The image photographing apparatus as claimed in claim 60, the actuation source comprising:

- a motor for receiving a power source from the controlling part to be rotated;

- a lead screw combined with the rotation shaft of the motor; and

- a screw holder combined with the lead screw to move in the direction orthogonal to the optical axis by rotation of the lead screw.

Claim 65 (currently amended): The image photographing apparatus of claim 64, the first zoom driving member comprising a third inclined surface formed on the screw holder and ascending the first zoom driving part in the direction of the optical axis when the screw holder moves in the direction orthogonal to the optical axis in order to move the compensation lens group along the second moving trajectory, ~~which is the zoom transition path~~, and the second zoom driving member comprising a fourth inclined surface formed on the screw holder and ascending the second zoom driving part in the direction of the optical axis when the screw holder moves in the direction orthogonal to the optical axis in order to move the displacement lens group along the second moving trajectory, ~~which is the zoom transition path~~.

Claim 66 (previously presented): The image photographing apparatus of claim 79, the focus actuator further comprising a plurality of iron plate attached to a predetermined position between the magnet and the yoke, thereby directing the current respectively applied to the driving coil to the end direction.

Claim 67 (canceled)

Claim 68 (previously presented): The image photographing apparatus of claim 93, the brake device comprising:

- a rotation shaft installed on the focus driving part;
- a brake driving part rotatably installed on the rotation shaft;
- a spring for pushing the brake driving part in a direction;
- a permanent magnet installed on a predetermined position of the brake driving part; and
- a driving coil installed adjacent to the brake driving part in a predetermined position of the first zoom driving part.

Claim 69 (currently amended): The image photographing apparatus of claim 68, wherein:93, the brake device characterized in that:

when the current is not applied to the driving coil, the brake driving part ~~maintaining the contacts contacting state to the~~ focus driving part, thereby fixing the focus driving part to the brake driving part by friction force ~~between the brake driving part and the focus driving part~~; and

when the current is applied to the driving coil, the brake driving part is attracted to the driving coil ~~direction~~ by cooperation of the magnetic force generated by the driving coil with the permanent magnet installed on the brake driving part so that the contact of the brake driving part to the focus driving part is cut, thereby freely moving the focus driving part.

Claim 70 (canceled)

Claim 71 (previously presented): The image photographing apparatus of claim 94, the brake device comprising:

- a rotation shaft installed on the second zoom driving part or the third driving part;
- a brake driving part rotatably installed on the rotation shaft;
- a spring for pushing the brake driving part in a direction;
- a permanent magnet installed on a predetermined position of the brake driving part; and
- a driving coil installed adjacent to the brake driving part in a predetermined position of the second zoom driving part or the third zoom driving part.

Claim 72 (currently amended): The image photographing apparatus of claim 71, ~~wherein the brake device characterized in that:~~

when the current is not applied to the driving coil, the brake driving part contacts ~~maintaining the contacting state to the second zoom driving part or the third zoom driving part,~~ thereby fixing the second zoom driving part or the third zoom driving part to the brake driving part ~~by friction force between the brake driving part and the second zoom driving part or the third zoom driving part;~~ and

when the current is applied to the driving coil, the brake driving part is attracted to the driving coil ~~direction~~ by cooperation of the magnetic force generated by the driving coil with the permanent magnet installed on the brake driving part so that the contact of the brake driving part to the second zoom driving part or the third zoom driving part is cut, thereby freely moving the second zoom driving part or the third zoom driving part.

Claim 73 (canceled)

Claim 74 (previously presented): The image photographing apparatus of claim 95, the shutter device comprising:

a base fixed to the first zoom driving part and having a light through-hole passing light through the compensation lens group;

a shutter part axially supported by the base; and

a piezo ceramic driving part for driving the shutter part by receiving a power source.

Claim 75 (previously presented): The image photographing apparatus of claim 95, the shutter device comprising:

a shutter plate forming a rotation hole which is rotatably combined with a hinge shaft formed on the base, and which opens and closes the light through-hole by rotational motion.

Claim 76 (previously presented): The image photographing apparatus of claim 75, the shutter plate is characterized in being installed on the opposite position based on the light through-hole to simultaneously open and close the light through-hole at both sides by the operation of the piezo ceramic driving part.

Claim 77 (currently amended): The image photographing apparatus of claim 76, wherein ~~said~~ each shutter plate is ~~characterized in being~~ axially supported in the base and forms a cam hole combined with a driving shaft of the piezo ceramic driving part, so that when the driving shaft performs a straight line motion, each said shutter plate performs a rotational motion to open and close the light through-hole.

Claim 78 (currently amended): The image photographing apparatus of claim 74, wherein the controlling part functions ~~is characterized in functioning~~ as an iris and is configured to close ~~which closes~~ narrow limits of the light through-hole by applying a small amount of the power source to the piezo ceramic driving part to drive the shutter part within narrow limits, and the controlling part functions as a shutter which closes the hole light through-hole by applying a large amount of the power source to the piezo ceramic driving part to drive a large range of the shutter part.

Claim 79 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a ~~focus~~ focusing-driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group, the focus actuator comprising: (i) a driving coil wound on one side of the focus driving part or the first zoom driving part to be fixed, the driving coil having a flat part and receiving current from the controlling part; and (ii) a magnet fixed to the other side of the focus driving part ~~or the first zoom driving part~~, wherein the polarity of the magnet has a polarity which is divided so that a magnetic flux passes over the flat part of the driving coil;
- a fixing part for supporting the focus actuator, the focus actuator further comprising a piezoelectric element installed between the compensation lens group and the fixing part or between the compensation lens group and the focusing driving part;
- a photographing element for photographing an image of an object passing the compensation lens group; and
- a controlling part for controlling the focus actuator and the photographing element, the controlling part configured to supply current to the driving coil to generate the magnetic flux.

Claim 80 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focusing driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part along to an optical axis for controlling the focus of the compensation lens group, the focus actuator comprising a restoration means spring for restoring the focus driving part to an the initial position along the optical axis;
- a fixing part for supporting the focus actuator;
- a photographing element for photographing an image of an object passing the compensation lens group; and
- a controlling part for controlling the focus actuator and the photographing element.

Claim 81 (currently amended): An image photographing apparatus comprising:
a compensation lens group;
a focus focusing-driving part for fixing the compensation lens group;
a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group the focus actuator comprising: (i) a driving part for receiving a power source from the controlling part to generate a dynamic force ~~moving~~-along the direction orthogonal to the optical axis; ~~and~~-(ii) a cam part for receiving the dynamic force of the driving part to switch the dynamic force transferring the focus driving part in the direction of the optical axis; and (iii) a restoration means for restoring the driving part to an initial position;
a fixing part for supporting the focus actuator;
a photographing element for photographing an image of an object passing the compensation lens group; and
a controlling part for controlling the focus actuator and the photographing element.

Claim 82 (currently amended): An image photographing apparatus comprising:
a compensation lens group;
a focus focusing-driving part for fixing the compensation lens group;
a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group, ~~the focus actuator comprising a piezoelectric element installed between the compensation lens group and the fixing part or between the compensation lens group and the first zoom driving part, and receiving the current from the controlling part to drive the compensation lens group in the direction of the optical axis;~~
a fixing part for supporting the focus actuator, the focus actuator comprising a piezoelectric element installed between the compensation lens group and the fixing part or between the compensation lens group and the focus driving part;
a photographing element for photographing an image of an object passing the compensation lens group; and
a controlling part for controlling the focus actuator and the photographing element, the controlling part configured to supply current to the focus actuator to drive the compensation lens group in the direction of the optical axis.

Claim 83 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focus ~~focusing~~-driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group;
- a fixing part for supporting the focus actuator, the focus actuator comprising a suspension member supported between the fixing part and the focus driving part so that the focus driving part is controlled to be moved along the direction of the optical axis direction to limit the driving of the focus driving part in the direction excluding the driving direction, thereby guiding the focus driving part to be accurately driven along the direction of the optical axis;
- a photographing element for photographing an image of an object passing the compensation lens group; and
- a controlling part for controlling the focus actuator and the photographing element.

Claim 84 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focusing driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part in a direction of ~~to~~ an optical axis for controlling the focus of the compensation lens group, the focus actuator comprising guide means for guiding ~~guiding~~ the focus driving part to be driven in the direction of the optical axis;
- a fixing part for supporting the focus actuator, the focus actuator further comprising a suspension member supported between the fixing part and the focus driving part so that the focus driving part is controlled to be moved along the direction of the optical axis to limit the driving of the focus driving part in the direction excluding the driving direction, thereby guiding the focus driving part to be accurately driven along the direction of the optical axis;
- a photographing element for photographing an image of an object passing the compensation lens group; and
- a controlling part for controlling the focus actuator and the photographing element.

Claim 85 (previously presented): An image photographing apparatus comprising:
a compensation lens group;
a focusing driving part for fixing the compensation lens group;
a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group, the focus actuator comprising:

- (i) a compensation driving part installed between the compensation lens group and the focus driving part to drive the compensation lens group;
- (ii) a compensating suspension member connected between the compensation driving part and the focus driving part to fix the compensation lens group to the focus driving part thereby become movable into the direction orthogonal to the optical axis of the compensation lens group;
- (iii) a compensation actuator supported between the compensation driving part and the focus driving part to drive the compensation driving part in the direction orthogonal to the optical axis;
- (iv) a displacement sensor installed on one side of the focus driving part for sensing the movement of the focus driving part in the direction orthogonal to the optical axis due to the hand trembling of the user; and
- (v) a servo controller driving the compensating actuator according to information of the displacement sensor to restore the focus driving part to the original state;

a fixing part for supporting the focus actuator;
a photographing element for photographing an image of an object passing the compensation lens group; and
a controlling part for controlling the focus actuator and the photographing element.

Claim 86 (previously presented): An image photographing apparatus comprising:
a compensation lens group;
a focus actuator for controlling the focusing of the compensation lens group;
a first zoom driving part for supporting the focus actuator;
a displacement lens group;
a second zoom driving part for supporting the displacement lens group;
a zoom actuator for driving the first zoom driving part to move the compensation lens group along a first moving trajectory, which is a zoom transition path, and driving the second zoom driving part to move the displacement lens group along a second moving trajectory, which is a path of a zoom transition path, the zoom actuator comprising:

- (i) an actuation source;
- (ii) a first zoom driving member for driving the first zoom driving part to move a compensation lens group along a first moving trajectory, which is a zoom transition path;
- (iii) a second zoom driving member for receiving a dynamic force from the actuation source and driving the second zoom driving part to move the displacement lens group along a second moving trajectory, which is a zoom transition path; and
- (iv) restoration means for restoring the first zoom driving part and the second zoom driving part to the original state;

a photographing element for photographing an image of an object passing the compensation lens group and the displacement lens group; and

a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 87 (previously presented): An image photographing apparatus comprising:
a compensation lens group;
a focus actuator for controlling the focusing of the compensation lens group;
a first zoom driving part for supporting the focus actuator;
a displacement lens group;
a second zoom driving part for supporting the displacement lens group;
a zoom actuator for driving the first zoom driving part to move the compensation lens group along a first moving trajectory, which is a zoom transition path, and driving the second zoom driving part to move the displacement lens group along a second moving trajectory, which is a path of a zoom transition path, the zoom actuator comprising:

- (i) a stator for receiving a power source from the controlling part and having coils to generate a magnetic field having first and second polarities, which are divided into a plurality of sections and which are alternated;
- (ii) two ring-shaped magnets, which are integrally assembled and in which its polarity is divided into a first polarity and a second polarity, so as to be exposed to the magnetic field generated from the coils;
- (iii) an assembly member for assembling the two ring-shaped magnets to have a 90 degree of phase;
- (iv) an upper part of the rotator for receiving a rotation force when current is applied to the first coil;
- (v) a lower part of the rotator for receiving a rotation force when current is applied to the second coil;
- (vi) a rotator assembling member for integrally assembling the two rotators to have 90 degree of phase difference with each other;
- (vii) a pair of a first rotator and a first stator for driving the compensation driving part;
- (viii) a first lens barrel for fixing the compensation lens group; and
- (ix) a first cam part for converting the rotation force of the first rotator to a feed force in the direction of an optical axis to and transferring it to the first lens barrel;

a photographing element for photographing an image of an object passing the compensation lens group and the displacement lens group; and

a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 88 (currently amended): An image photographing apparatus comprising:

a focus lens group;

a focus actuator for adjusting the focusing of the focusing lens group;

a fixing part for supporting the focus actuator;

a compensation lens group;

a ~~first third~~ zoom driving part for supporting the compensation lens group;

a displacement lens group;

a second zoom driving part for supporting the displacement lens group;

a zoom actuator for driving the ~~first third~~ zoom driving part to move the compensation lens group along ~~a the~~ first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along ~~a the~~ second moving trajectory, the zoom actuator comprising:

(i) a first zoom driving member for driving the first zoom driving part to move a compensation lens group along the first moving trajectory;

(ii) a second zoom driving member for receiving a dynamic force from the actuation source and driving the second zoom driving part to move the displacement lens group along the second moving trajectory; and

(iii) restoration means for restoring the first zoom driving part and the second zoom driving part to an original state;

a photographing element for photographing an object image passing the compensation lens group and the displacement lens group; and

a controlling part for controlling the focus actuator, the zoom actuator and the photographing element, the focus actuator comprising a piezoelectric element installed between the compensation lens group and the first zoom driving part, and receiving the current from the controlling part to drive the first zoom driving part in the direction of the optical axis.

Claim 89 (currently amended): An image photographing apparatus comprising:

a focus lens group;

a focus actuator for adjusting the focusing of the focusing lens group;

a fixing part for supporting the focus actuator;

a compensation lens group;

a first ~~third~~-zoom driving part for supporting the compensation lens group, the first zoom driving part comprising: (i) a first lens barrel combined with the compensation lens group in its interior and forming a first male screw on its outer circumference; (ii) a second lens barrel combined with a focus actuator in its exterior and forming a first female screw, which is screw-combined with the first male screw on its inner circumference; and (iii) a tool groove installed on the first lens barrel to insert and rotate a tool;

a displacement lens group;

a second zoom driving part for supporting the displacement lens group, the second zoom driving part comprising: (i) a fourth lens barrel combined with the displacement lens group in its interior and forming a second male screw on its outer circumference; and (ii) a fourth lens barrel forming a second female screw, which is screw-combined with the second male screw on its inner circumference;

a zoom actuator for driving the first ~~third~~-zoom driving part to move the compensation lens group along a ~~the~~-first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along a ~~the~~-second moving trajectory;

a photographing element for photographing an object image passing the compensation lens group and the displacement lens group; and

a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 90 (currently amended): An image photographing apparatus comprising:

- a focus lens group;
- a focus actuator for adjusting the focusing of the focusing lens group;
- a fixing part for supporting the focus actuator;
- a compensation lens group;
- a first ~~third~~-zoom driving part for supporting the compensation lens group, the first ~~third~~ zoom driving part comprising: (i) a first ~~fifth~~-lens barrel combined with the compensation lens group in its interior and forming a first ~~third~~-male screw on its outer circumference; and (ii) a second ~~sixth~~-lens barrel forming a first ~~third~~-female screw which is screw-combined with the first ~~third~~-male screw; and (iii) a tool groove installed on the first lens barrel to insert and rotate a tool;
- a displacement lens group;
- a second zoom driving part for supporting the displacement lens group;
- a zoom actuator for driving the first ~~third~~-zoom driving part to move the compensation lens group along a ~~the~~-first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along a ~~the~~-second moving trajectory;
- a photographing element for photographing an object image passing the compensation lens group and the displacement lens group; and
- a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 91 (currently amended): An image photographing apparatus comprising:

a focus lens group;

a focus actuator for adjusting the focusing of the focusing lens group;

a fixing part for supporting the focus actuator;

a compensation lens group;

a first ~~third~~-zoom driving part for supporting the compensation lens group;

a displacement lens group;

a second zoom driving part for supporting the displacement lens group;

a zoom actuator for driving the first ~~third~~-zoom driving part to move the compensation lens group along a ~~the~~-first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along a ~~the~~-second moving trajectory, the zoom actuator comprising:

(i) ___an actuation source;

(ii) ___a first zoom driving member for receiving a dynamic force from the actuation source and driving the first zoom driving part to move a compensation lens group along the ~~a~~-first moving trajectory, which is a ~~the~~ first zoom transition path; and

(iii) ___a second zoom driving member for receiving a dynamic force from the actuation source and driving the second zoom driving part to move the displacement lens group along the ~~a~~-second moving trajectory, which is a ~~second~~ second ~~the~~-zoom transition path; and

(iv) restoration means for restoring the first zoom driving member to an initial position thereof and for restoring the second zoom driving member to an initial position thereof;

a photographing element for photographing an object image passing the compensation lens group and the displacement lens group; and

a controlling part for controlling the focus actuator, the zoom actuator and the photographing element.

Claim 92 (previously presented): An image photographing apparatus comprising:

- a focus lens group;
- a focus actuator for adjusting the focusing of the focusing lens group;
- a fixing part for supporting the focus actuator;
- a compensation lens group;
- a third zoom driving part for supporting the compensation lens group;
- a displacement lens group;
- a second zoom driving part for supporting the displacement lens group;
- a zoom actuator for driving the third zoom driving part to move the compensation lens group along the first moving trajectory, and for driving the second zoom driving part to move the displacement lens group along the second moving trajectory;
- a photographing element for photographing an object image passing the compensation lens group and the displacement lens group;
- a controlling part for controlling the focus actuator, the zoom actuator and the photographing element; and
- first restoration means for restoring the first zoom driving part and the second zoom driving part to the original state.

Claim 93 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focusing driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part along ~~to~~ an optical axis for controlling the focus of the compensation lens group;
- a fixing part for supporting the focus actuator;
- a photographing element for photographing an image of an object passing the compensation lens group;
- restoration means for restoring the focus driving part to an initial position thereof;
- a controlling part for controlling the focus actuator and the photographing element; and
- a brake device fixed to the focus driving part for controlling the driving of the focus driving part.

Claim 94 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focus actuator for controlling the focusing of the compensation lens group;
- a fixing part for supporting the focus actuator;
- a first zoom driving part for supporting the focus actuator, the focus actuator comprising a piezoelectric element installed between the compensation lens group and the fixing part or between the compensation lens group and the first zoom driving part;
- a displacement lens group;
- a second zoom driving part for supporting the displacement lens group;
- a zoom actuator for driving the first zoom driving part to move the compensation lens group along a first moving trajectory, which is a first zoom transition path, and driving the second zoom driving part to move the displacement lens group along a second moving trajectory, which is ~~a path of a~~ second zoom transition path;
- a photographing element for photographing an image of an object passing the compensation lens group and the displacement lens group;
- a controlling part for controlling the focus actuator, the zoom actuator and the photographing element; and
- a brake device fixed to the first ~~second~~-zoom driving part or ~~one of the second~~ zoom driving part to control the driving of the first ~~second~~-zoom driving part or the second ~~third~~-zoom driving part.

Claim 95 (currently amended): An image photographing apparatus comprising:

- a compensation lens group;
- a focusing driving part for fixing the compensation lens group;
- a focus actuator transferring the focusing driving part to an optical axis for controlling the focus of the compensation lens group;
- a fixing part for supporting the focus actuator, the focus actuator comprising a piezoelectric element installed between the compensation lens group and the fixing part or between the compensation lens group and the focusing driving part;
- a photographing element for photographing an image of an object passing the compensation lens group;
- a controlling part for controlling the focus actuator and the photographing element; and
- a shutter device installed between the compensation lens group and the focus driving part, or installed between the compensation lens group and the fixing part~~first zoom driving~~, thereby controlling the light quantity.